

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of the Claims:

1 - 4. (Canceled)

5. (Currently Amended) A method for detecting defects in microfabricated structures having repetitive and non-repetitive regions, the method comprising:

- a. acquiring contrast data from the microfabricated structures;
- b. ~~analyzing automatically the contrast data to find finding~~ repetitive regions of the ~~contrast data~~ ~~microfabricated structures by creating at least one X-direction one-dimensional profile of a cell-metric of the contrast data and at least one Y-direction one-dimensional profile of the cell-metric of the contrast data and thresholding the at least one X-direction one-dimensional profile and the at least one Y-direction one-dimensional profile to derive contrast data of the repetitive regions; and~~
- c. comparing the ~~repetitive regions of the contrast data of the repetitive regions~~ with reference data ~~concerning said repetitive regions~~ to detect defects in the microfabricated structures;

~~wherein the analyzing step includes creating at least one X-direction one-dimensional profile of a cell metric of the contrast data and at least one Y-direction one-dimensional profile of the cell metric of the contrast data and thresholding the at least one X-direction one-dimensional profile and the at least one Y-direction one-dimensional profile to find the repetitive regions in the contrast data.~~

6. (Currently Amended) The method of claim 5, wherein the ~~reference data are repetitive cells in the repetitive regions~~ comprise repetitive cells within the microfabricated structures.

7. (Currently Amended) The method of claim 5 further comprising finding non-repetitive regions ~~in the contrast data of the microfabricated structures~~ and comparing contrast data of the non-repetitive regions so found of the contrast data with ~~non-repetitive reference data concerning said non-repetitive regions.~~

8 - 16 (Canceled)

17. (Currently Amended) The method of claim 5, wherein ~~the analyzing step finding repetitive regions~~ includes creating at least two X-direction one-dimensional profiles of ~~a~~ the cell-metric of the contrast data and at least two Y-direction one-dimensional profiles of the cell-metric of the contrast data and thresholding the two X-direction one-dimensional profiles and the two or more Y-direction one-dimensional profile to find the repetitive regions in the ~~contrast data~~ microfabricated structures.

18. (Currently Amended) The method of claim 5, wherein ~~the acquiring contrast data step is performed~~ comprises acquiring the contrast data with an e-beam inspection system.

19. (Currently Amended) The method of claim 5 ~~that further comprises further comprising~~ reporting defect data of detected defects.

20. (Original) The method of claim 5, wherein the microfabricated structures are on a semiconductor wafer.

21. (Currently Amended) The method of claim 5, wherein ~~the comparing step further comprises arbitration comparison of the contrast data with at least two reference data sets.~~

22. (Currently Amended) The method of claim 5, wherein the acquiring step comprises acquiring the contrast data with an integer number of pixels across a single repeated cell of the microfabricated structure structures.

23. (Currently Amended) A method for defect inspection of semiconductor wafers having repetitive and non-repetitive regions, the method comprising:

a. acquiring contrast data from the semiconductor wafer with an e-beam defect inspection system;

b. analyzing the contrast data to find finding the repetitive regions of the contrast data- semiconductor wafers by creating at least one X-direction one-
dimensional profile of a cell-metric of the contrast data and at least one Y-direction one-
dimensional profile of the cell-metric of the contrast data and thresholding the at least
one X-direction one-dimensional profile and the at least one Y-direction one-
dimensional profile to derive contrast data of the repetitive regions;

c. comparing the repetitive regions of the contrast data of the repetitive regions with reference data concerning the repetitive regions to detect defects and find locations of the defects in the semiconductor wafer; and

d. reporting the locations of the defects;

wherein the analyzing includes creating at least one X-direction one-
dimensional profile of a cell-metric of the contrast data and at least one Y-direction one-
dimensional profile of the cell-metric of the contrast data and thresholding the at least
one X-direction one-dimensional profile and the at least one Y-direction one-
dimensional profile to find the repetitive regions in the contrast data.

24. (Currently Amended) A defect inspection system for detecting defects in microfabricated structures having repetitive and non-repetitive regions, the system comprising:

an XY stage disposed to support the microfabricated structures for inspection;

a microscope and detector oriented with respect to the XY stage so as to acquire contrast data of the microfabricated structures supported thereby;

an image computer equipped with stored program instructions for processing the contrast data to ~~detect defects in the microfabricated structures, the processing comprising analyzing automatically the contrast data to find repetitive regions of the microfabricated structures by creating at least one X-direction one-dimensional profile of a cell-metric of the contrast data and at least one Y-direction one-dimensional profile of the cell-metric of the contrast data and thresholding the at least one X-direction one-dimensional profile and the at least one Y-direction one-dimensional profile, contrast data and comparing those portions of the contrast data obtained from the repetitive regions with repetitive reference data concerning said repetitive regions to the detect defects in the microfabricated structures, and the analyzing automatically the contrast data includes creating at least one X-direction one-dimensional profile of a cell-metric of the contrast data and at least one Y-direction one-dimensional profile of the cell-metric of the contrast data and thresholding the at least one X-direction one-dimensional profile and the at least one Y-direction one-dimensional profile to find the repetitive regions in the contrast data.~~

25. (Original) The defect inspection system of claim 24 wherein the microscope is an e-beam-based microscope.

26. (Currently Amended) The defect inspection system of claim 24 wherein the ~~reference data are repetitive cells in the repetitive regions comprise repetitive cells of the microfabricated structures.~~

27 - 30. (Canceled)

31. (Original) The defect inspection system of claim 24 wherein the microscope is an optical microscope.

32. (Original) The defect inspection system of claim 24 wherein the microfabricated structures are on a semiconductor wafer.

33. (Original) The defect inspection system of claim 24 wherein a magnification of the microscope is set to ensure an integer number of pixels of the contrast data across a single repeated cell of the microfabricated structures.

34. (Currently Amended) The defect inspection system of claim 24 wherein the instructions for processing further comprises analyzing automatically the contrast data to find comprise finding non-repetitive regions of the contrast data microfabricated structures and comparing the contrast data of the non-repetitive regions with non-repetitive reference data concerning the non-repetitive regions to the detect further defects in the microfabricated structures.

35. (Currently Amended) The defect inspection system of claim 24 wherein detected defects are reported the instructions for processing further comprise reporting detected defects.

36. (Currently Amended) A defect inspection system for detecting defects in microfabricated structures having repetitive and non-repetitive regions, the system comprising:

XY stage means disposed to support the microfabricated structures for inspection;

microscope means and detector means oriented with respect to the XY stage means so as to acquire contrast data of the microfabricated structures supported thereby;

means for processing the contrast data to detect defects in the microfabricated structures, the means for processing comprising means for analyzing the contrast data to find repetitive regions of the contrast data and means for microfabricated structures by creating at least one X-direction one-dimensional profile of a cell-metric of the contrast data and at least one Y-direction one-dimensional profile of the cell-metric of the

contrast data and thresholding the at least one X-direction one-dimensional profile and the at least one Y-direction one-dimensional profile, and for comparing those portions of the contrast data from the repetitive regions with repetitive reference data concerning the repetitive regions to the detect defects in the microfabricated structures;

wherein the means for analyzing the contrast data includes means for creating at least one X-direction one-dimensional profile of a cell metric of the contrast data and at least one Y-direction one-dimensional profile of the cell metric of the contrast data and means for thresholding the at least one X-direction one-dimensional profile and the at least one Y-direction one-dimensional profile to find the repetitive regions in the contrast data.

37. (Original) The defect inspection system of claim 36 wherein the microscope means is an e-beam-based microscope.

38. (Currently Amended) The defect inspection system of claim 36 wherein the reference data are repetitive cells in the repetitive regions comprise repetitive cells of the microfabricated structures.

39 - 42. (Canceled)

43. (Original) The defect inspection system of claim 36 wherein the microscope means is an optical microscope.

44. (Original) The defect inspection system of claim 36 wherein the microfabricated structures are on a semiconductor wafer.

45. (Original) The defect inspection system of claim 36 wherein a magnification of the microscope means is set to ensure an integer number of pixels of the contrast data across a single repeated cell of the microfabricated structures.

46. (Original) The defect inspection system of claim 36 wherein the processing means for processing further comprises means are configured for analyzing the contrast data to find finding non-repetitive regions of the contrast data microfabricated structures and means for comparing contrast data of the non-repetitive regions with non-repetitive reference data concerning the non-repetitive regions to the detect further defects in the microfabricated structures.

47. (Original) The defect inspection system of claim 36 wherein detected defects are reported the means for processing are configured to report detected defects.